Interaction diagram in finite element analysis of deflection of pretensioned inverted T-beam with web openings strengthened with GFRP laminates

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ABSTRACT
A precast, prestressed concrete girder with circular web openings allows building service systems (mechanical, electrical, communications, and plumbing) to cross the girder line within the memberpsilas depth, reducing a buildingpsilas floor -to-floor height and the overall height of the structure. These height reductions have the potential to improve the competitiveness of total precast concrete structures versus other types of building systems. The experimental program reported in this paper tested three inverted -tee girders with circular web openings strengthened with GFRP to failure to evaluate the openingspsila effect on girder behavior. The test girders were designed using available recommendations in the existing literature. Finite element is used to plot interaction diagram in estimating the cracking load for the different crack patterns was perform. Good agreement was shown between the interaction diagram and the experimental results.

KEYWORDS
GFRP; Finite element; Prestressed inverted T- beam; Interaction diagram; Web opening

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